REMARKS

Claims 1-28 are pending and stand rejected in the above-captioned application. Claims 29-57 were withdrawn by the Examiner as being drawn to a non-elected invention. Claims 1, 2, 6, 10-16, 18-19, and 25-28 have been amended herein. A marked up version of the amended claims is submitted herewith as Appendix A.

I. Election/Restrictions

In response to the Restriction Requirement, Applicants hereby confirm the election to prosecute the claims in Group I (claims 1-28) without traverse. Applicants expressly reserve the right to prosecute the non-elected claims in Group II (claims 29-57) in one or more later-filed divisional applications.

II. Rejection Under 35 U.S.C. §112, second paragraph

Claims 1-28 were rejected under 35 U.S.C. §112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Specifically, the claims were rejected because it was alleged by the Examiner that the relative terms "deep" and "shallow" render the claims indefinite. In order to remove any alleged vagueness from the claims, the claims have been amended herein to remove these terms and thus obviate this ground of rejection.

The elimination of the terms "deep" and "shallow" also removes the Examiner's basis for the rejection of claims 2-9 and 19-22. The Examiner appeared to argue that the overlapping ranges of depth provided for the "deep" and "shallow" channels in those claims were problematic because they provided no guidance in differentiating between what was meant by the terms "deep" and "shallow". Since the allegedly vague terms have been removed, the overlapping depth ranges no longer contribute to the vagueness of those terms. Accordingly, the basis for this rejection has been removed.

Finally, claims 25-27 were rejected under Section 112 because those claims allegedly give the term "electroosmotic pump" a meaning repugnant to its usual meaning. Applicant respectfully submits that the use of this term is appropriate. Applicant is not using the term "electroosmotic pump" to refer to electroosmotic flow or to a mechanical pump. Instead, Applicant uses the term "electroosmotic pump" to refer to a specific type of device that induces fluid motion in a microfluidic device. See Application pg. 12 line 33 – pg. 13 line 12. The

device is a "pump", as that term is ordinarily used, because the device induces fluid motion. The adjective "electroosmotic" applies to the pump because the pump uses electroosmotic flow in one channel to generate the pressure required to induce fluid motion in a second channel. Applicant has defined the term "electroosmotic pump" in a manner consistent with the ordinary meanings of both "electroosmotic" and "pump". Accordingly, Applicant asserts that it is not proper to reject claims 25-27 because they contain the term "electroosmotic pump".

III. Rejection Under 35 U.S.C. §102(e) 35 U.S.C. §103(a)

Claims 1-9 and 16-28 were rejected under 35 U.S.C. §102(e) as allegedly being anticipated by Taylor et al. (U.S. Pat. 6,375,817) ("Taylor"). To anticipate a claim, a reference must teach every element of the claim. MPEP § 2131. Taylor does not anticipate as-amended claim 1 because Taylor does not disclose the concept of transporting (i.e. introducing) the sample into the separation channel by applying a voltage across the separation channel. Instead, Taylor only discloses the concept of transporting a sample into the separation channel using pressure. See e.g. Taylor col. 2, lines 35-58. The voltage generator discussed in Taylor (e.g. at col. 3 lines 11-16) is only used to electrophoretically separate the sample after it has been introduced into the separation channel, or to stack the sample before it is introduced into the separation channel (Taylor col. 8 line 18 – 24; Fig. 3C). The voltage source in Taylor never appears to be used to electrokinetically transport the sample from the introduction channel into the separation channel. Instead, it appears that in every embodiment Taylor discloses the sample is placed into the separation channel using pressure and not voltage. Taylor col. 2, lines 35-58; col. 6 line 65 – col. 7 line 7; Figure 2C; col. 7 lines 28-32 (discussing various ways of applying the sample-introducing pressure); col. 8 line 18 – 24; Fig. 3C; col. 14 lines 29-34. In contrast, the as-amended claims require that a voltage be used to transport the sample into the separation channel. Support for this requirement may be found throughout the application. See e.g. Application pg. 14 lines 6-9; pg.15 lines 11-13; pg. 32 lines 4-6. Since Taylor does not disclose the concept of electrokinetically introducing a sample into a separation channel, and since all of the claims allegedly anticipated by Taylor now require electrokinetic injection (since all of those claims ultimately depend from as-amended claim 1), Taylor cannot anticipate any of the pending claims.

Claims 10-15 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Taylor as applied to claims 1-9 and 16-28 above, and further in view of

Christel et al. (U.S. Pat. 6,368,871) ("Christel"). This rejection is rendered moot by Applicant's amendments to claim 1 that require electrokinetic injection of the sample into the separation channel. Since neither Taylor nor the combination of Taylor and Christel anticipate or suggest all of the limitations of claim 1, claim 1 (and claims depending from claim 1) cannot be rendered obvious by the combination of Taylor and Christel. See e.g. MPEP 2143.03 (In order for an obviousness rejection to be proper, all claim limitations must be taught by the prior art.).

CONCLUSION

In view of the foregoing amendments and remarks, Applicants believe that the present application is in condition for allowance and action toward that end is respectfully requested. If the Examiner believes that a telephone interview would expedite the examination of this application, the Examiner is requested to contact the undersigned at the telephone number below.

Respectfully submitted,

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APPENDIX A
Marked Up Version of Claims

1. (Amended) A microfluidic device, the device comprising:

(i) a body structure with a plurality of microscale channels disposed therein, the plurality of microscale channels comprising:

(a) a **[deep]** mixing channel; and,

(b) a **[shallow]** separation channel fluidly coupled to the **[deep]** mixing channel, wherein the **[deep]** mixing channel has a first cross-sectional area and the **[shallow]** separation channel has a second cross-sectional area, which first cross-sectional area is larger than the second cross-sectional area;

(ii) a pressure source in fluid communication with the **[deep]** mixing channel, which pressure source introduces one or more samples into the **[deep]** mixing channel by applying pressure to the **[deep]** mixing channel; and,

(iii) an electrokinetic controller in fluid communication with the **[shallow]** separation channel, which electrokinetic controller transports the one or more samples into **[through]** the **[shallow]** separation channel by applying a voltage to the **[shallow]** separation channel.

2. (Amended) The microfluidic device of claim 1, wherein the **[deep]** mixing channel has a depth and a width, which depth is between about 5 μm and about 100 μm and which width is between about 5 μm and about 100 μm.

6. (Amended) The microfluidic device of claim 1, wherein the **[shallow]** separation channel has a depth and a width, which depth is between about 1 μm and about 20 μm and which width is between about 1 μm and about 20 μm.

10. (Amended) The device of claim 1, wherein the **[deep]** mixing channel has a first depth and the **[shallow]** separation channel has a second depth, which first depth is at least about 2 times as **[deep]** as the second depth.

11. (Amended) The device of claim 1, wherein the **[deep]** mixing channel has a first depth and the **[shallow]** separation channel has a second depth, which first depth is at least about 5 times as **[deep]** as the second depth.

12. (Amended) The device of claim 1, wherein the **[deep]** mixing channel has a first depth and the **[shallow]** separation channel has a second depth, which first depth is at least about 10 times as **[deep]** as the second depth.

13. (Amended) The device of claim 1, wherein the **[deep]** mixing channel has a first width and the **[shallow]** separation channel has a second width, which first width is at least about 2 times as wide as the second width.

14. (Amended) The device of claim 1, wherein the **[deep]** mixing channel has a first width and the **[shallow]** separation channel has a second width, which first width is at least about 4 to about 5 times as wide as the second width.

15. (Amended) The device of claim 1, wherein the **[deep]** mixing channel has a first width and the **[shallow]** separation channel has a second width, which first width is at least about 10 times as wide as the second width.

16. (Amended) The microfluidic device of claim 1, wherein the **[shallow]** separation channel comprises a separation matrix.

18. (Amended) The microfluidic device of claim 1, further comprising a **[shallow]** loading channel fluidly coupled to the **[deep]** mixing channel and intersecting the **[shallow]** separation channel.

19. (Amended) The microfluidic device of claim 18, wherein the **[shallow]** loading channel has a depth and a width, which depth is between about 1 μm and about 20 μm and which width is between about 1 μm and about 20 μm.

25. (Amended) The microfluidic device of claim 1, wherein the pressure source comprises an electroosmotic pump fluidly coupled to the **[deep]** mixing channel.

27. (Amended) The microfluidic device of claim 25, wherein the electroosmotic pump draws a sample into the **[deep]** mixing channel and the electrokinetic controller injects the sample from the **[deep]** mixing channel into the **[shallow]** separation channel.

28. (Amended) The microfluidic device of claim 1, the device further comprising a **[shallow]** loading channel, wherein the electrokinetic controller electrokinetically loads the sample into the **[shallow]** loading channel from the **[deep]** mixing channel and electrokinetically injects the sample into the **[shallow]** separation channel from the **[shallow]** loading channel.